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while the Echini were most abundant in the Bajocian stage of the Jurassic, the crinoids attained their maximum in the Oxfordian. After the Sequanian they suddenly diminish, and only one species occurs in the Portlandian.

Quaternary.—At Ternefine near Maseara (Algeria) teeth of two species of Elephas (*E. atlanticus* and *E. melitensis*) have been found, also *Rhinocerus mauritanicus*, a hippopotamus and *Camelus thomasi.* The last is of about the size of the dromedary, but differs in the shape of the palate and jugal bones. With these were found a horse rather larger than the zebra, some antelopes, an ox, and a single bone of a swine. Roughly-shaped hatchets of limestone or coarse sandstone show the presence of man, but no remains of the domestic dog and no bones marked by the teeth of Carnivores were found. The presence of a large number of the cotyloid cavities of the pelvis of the elephant seem to indicate that they were used as utensils, and the numerous canines and incisors of the hippopotamus found were probably employed as weapons.

MINERALOGY AND PETROGRAPHY.[1]

AMERICAN MINERALS.—*Quartz.*—Vom Rath describes[2] quite a number of complicated forms on the quartz crystals from Alexander and Burke counties, N. C. The former have already been mentioned in these notes.[3] Among the rare forms on the latter are $-\frac{11}{18} R \frac{11}{7}$, P_2 and a rough face to which the symbol $0P$ may be referred.

Stephanite.—In the same article a stephanite crystal from Mexico, containing the new form $\frac{11}{6} \breve{P} \frac{11}{3}$ is described.

Alaskaite of König,[4] has been reëxamined by Th. Liweh, of Strassburg, who declares it to be tetrahedrite. He found it to crystallize in the hemihedral division of the regular system.

In the November number of the NATURALIST, fayalite was mentioned as having been found by Mr. J. P. Iddings in the lithophyses of the obsidian and rhyolite from the Yellowstone Park. About the same time C. A. Tenne,[5] of Berlin, found the same small black crystals in the lithophyses of obsidians from the Cerro de las Navajas, Mexico. They were measured and pronounced to be the same mineral which G. Rose, as early as 1827,[6] had declared to be olivine.

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[1] Edited by W. S. BAYLEY, Johns Hopkins Univ., Baltimore, Md.

[2] Mineralogische Mittheilungen. Zeitschrift für Krystallographie, X, pp. 156 and 475.

[3] May, 1885.

[4] Ueber die alaskaite, ein neues Glied aus der Reihe der wismuthsulfosalze. Zeitschrift für Krystallographie, VI, p. 42.

[5] Zeitschrift der deutschen geol. Gesellschaft, 1885, p. 613.

[6] Annalen der Physik. u. Chemie, 1827, Bd. X, pp. 323–332.

Turquoise pseudomorphs after apatite have been discovered[1] in several localities in California with the original forms so well preserved as to leave no doubt as to the character of the mineral after which they are pseudomorphed. The angles between the ∞P faces gave, on the reflexion goniometer, a mean value of 59° 56′, that between $0P$ and ∞P measured 89° 39′, and those between $0P$ and P 40° 35¾′. (Kokscharon found on apatite from Tokovaia $0P \wedge P = 40° 18′–40° 47′$.) Professor H. Bücking examined thin sections of the specimens and found the substance to consist of an aggregate of small spherulites composed of fibers radially arranged.

Two *pure iron micas* from Branchville, Conn., have been added to the mica group by Rammelsberg.[2] One of a light color gave, on analysis:

SiO_2	Al_2O_3	Fe_2O_3	FeO	K_2O	Na_2O	Li_2O	H_2O	Fl
44.19	32.69	4.75	3.90	8.00	.59	.21	.3.85	.93

A dark-brown variety gave:

SiO_2	Al_2O_3	Fe_2O_3	FeO	K_2O	Na_2O	Li_2O	H_2O	Fl	TiO_2
39.94	23.43	7.65	11.87	9.64	1.13	1.18	2.64	2.43	.20

The composition of the first corresponds to $\left\{\begin{array}{c} 6\ R_4'\ SiO_4 \\ Fe_2\ SiO_4 \\ 7\ \not{R}_2\ Si_3O_{12} \end{array}\right\}$; of the second to $\left\{\begin{array}{c} 2\ R_4'\ SiO_4 \\ Fe_2\ SiO_4 \\ 2\ \not{R}_2\ Si_3O_{12} \end{array}\right\}$. In neither case was any Mg detected. Their optical properties were not investigated.

Microlite.—C. Hintze[3] has shown by optical methods that this mineral, first described by Dunnington[4] from Amelia county, Va., crystallizes in the regular system.

In a paper read before the American Philosophical Society, F. A. Genth[5] gives the results of the analyses of a number of minerals belonging to the sulpho-salts and allied groups. The mineral joséite, concerning whose composition there has been considerable doubt, yielded the author:

Te	Se	S	Bi
14.67 per cent	1.46 per cent	2.84 per cent	81.23 per cent

This composition, Genth thinks, cannot be expressed by a rational formula unless we suppose the mineral to be a bismuth sulphide in which the sulphur is replaced in part by tellurium, selenium and bismuth, giving the general formula both for joséite and the closely related tetradymite $Bi_2\ (Te\ Se\ S\ Bi)_3$. An argento-bismuthite, from Lake City, Col., gave results corresponding to $(Ag_2 Pb) S, Bi_2 S_3$. Cosalite is a sulpho-bismuthite of the formula $2 (Pb Ag_2) S, Bi_2 S_3$ from Cosala, Mexico. In the Gladiator mine, Ouray county, Col., a compact mineral occurs in small irregular masses. An analysis shows it to be cosalite with part of the silver replaced by Cu, having the formula $2 (Pb Ag_2 Cu_2) S, Bi_2 S_3$. Schirmerite, beegerite, tetrahedrite, sylvanite and polybasite from Colorado, and arsenopyrite and scorodite from Alabama are the other sulphur salts examined. Ilmenite from Carter's mine, N. C., topaz from Stoneham, Me., muscovite pseudomorphs after nepheline from Wakefield, Conn., stilpnomelane pseudomorphs after "an unknown tabular mineral," from Sterling mine, near Antwerp, N. Y., and several alteration products of the magnesian limestone of Berks county, Pa., are also described and the results of their analyses given.

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[1] Kallait pseudomorph nach apatite aus California, G. E. Moore and V. von Zepharovich. Zeitschrift für Krystallographie x, p. 240.

[2] Neues Jahrb. für Min., etc., 1885, II, p. 225.

[3] Zeitschrift für Krystallographie, x, p. 86.

[4] *Amer. Chem. Jour.*, 3, p. 130, May, 1881.

[5] Contributions from the laboratory of the Univ. of Pennsylvania. No. XXIV. Contributions to mineralogy, read Oct. 2, 1885.

MICROCHEMICAL REACTIONS.—It is often possible by means of a few simple chemical tests to determine the character of a mineral under the microscope without the trouble of separating and analyzing it. The methods in most general use for this purpose are those of Streng[1] for the detection of apatite and nepheline, of Knop[2] for the minerals of the Hauyne group, of Boricky[3] for the feldspars and of Behrens[4] for the characteristic elements of many other minerals. These and a great many others have been described at length in the various mineralogical magazines, but have not, until very lately, been collected and put in shape for ready use. Dr. Haushofer, of Munich, has recently brought together all those methods which have stood the test of experience, and to these has added others of his own. The result is a compact little book[5] containing minute directions for the detection of fifty elements by means of simple tests, most of which may be applied to the rock section or mineral particle on the stage of the microscope. The illustrations are good and the directions for working clearly given.

CRYSTALLOGRAPHIC NEWS.— E. Rethwisch[6] has made a very thorough study of pyrargyrite and proustite from an historical, chemical and crystallographic standpoint. His paper is particularly interesting as a résumé of our knowledge in regard to these two minerals.——In the same way F. Sansoni proposes to study calcite. He begins his work with an exhaustive paper of fifty-six pages on the crystals from Andreasburg.[1] He divides these into eight groups, according to their development, and then studies each group separately. Tables giving the frequency with which the 131 forms actually observed occur, and the combinations in which they are found, make up a considerable part of the article.

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[1] A. Streng. Ueber die mikroskopische Unterscheidung von nepheline and apatite. Tschermak's Min. und Pet. Mitth., 1876, p. 167.

[2] A. Knop. Ueber eine mikrochemische reaction auf die Glieder der Hauynfamilie. Neues Jahrb. der Min., etc., 1875, p. 74.

[3] E. Boricky. Elemente einer neuen chemisch-mikroskopischen Mineral- und Gesteins-analyse. Archiv. d. naturw. Landes durchforsch. Böhmens. III Bd., V Abth., Prag, 1877, and Neues Jahrb. f. Min., etc., 1879, p. 564.

[4] Th. H. Behrens. Mikrochemische Methoden zur Mineral-analyse. Verslagen en Mededeelingen der K. Akad. v. Wetenschappen. Amsterdam, 1881. Afdeeling Natuurkunde, 2 Reeks, XVII Deel., pp. 27–73.

[5] Mikroskopische Reactionen. Eine Anleitung zur Erkennung Verschiedener Elemente und Verbindungen unter dem Mikroskop. Vieweg und Sohn, 1885. 162 pp., 137 illus.

[6] Neues Jahrb. für Min., etc. Beilage Band IV, p. 40.

MISCELLANEOUS.—A chemical examination of nocerite[2] from Samo-Nocera leads E. Fischer to consider it a mixed fluoride and oxide with the composition $2\,(Ca\,Mg)\,Fl_2 + (Ca\,Mg)\,O$.——In an article on the Thüringian minerals, Luedecke[3] describes crystals of orthite, from near Schmiedefeld, with the two new planes $5\,P_{\bar{\infty}}$ and $\infty P_{\bar{10}}$, others from a granitite near Brotterode with $\frac{7}{3}\,P_{\bar{\infty}}$, and tiny brown anatase crystals on small quartz crystals in the lithophyses of a quartz porphyry from Brand, Thüringer Wald.

BOTANY.[4]

THE ASA GRAY VASE.—During the meeting of the American Association for the Advancement of Science, at Ann Arbor, in August last, the presence of so many botanists, and especially their frequent club meetings, suggested to the editors of the *Botanical Gazette* the possibility of some concerted action on the part of the botanists of the country to commemorate Dr. Asa Gray's seventy-fifth birthday anniversary. After some informal consultation, the matter was left in the hands of the originators to be managed as they thought best. Accordingly, notices were sent to as many American botanists as it was possible to reach in the short time at the disposal of the committee. The responses were most gratifying, and enabled the committee to select a design of a vase by L. E. Jenks, of Boston. The vase is solid silver, eleven inches in height, and stands upon a silver-hooped ebony pedestal. The ornamentation is very properly entirely botanical, and consists of plants in some way associated with Dr. Gray's work, or which are distinctively American. In the center of one side is *Grayia polygaloides*, on the other *Shortia galacifolia.* The following species are represented in the surrounding figures, viz: *Adlumia cirrhosa*, *Rudbeckia speciosa*, *Centaurea americana*, *Aquilegia canadensis*, *Aster bigelovii*, *Solidago serotina*, *Notholæna grayi*, *Lilium grayi*, *Dionæa muscipula*, *Jeffersonia diphylla*, *Mitchella repens*, *Epigæa repens.* The beauty of design and finish, as

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[1] Zeitschrift für Krystallographie, x, p. 545.
[2] Zeitschrift für Krystallographie, x, p. 271.
[3] Ib., x, p. 187.
[4] Edited by Professor CHARLES E. BESSEY, Lincoln, Nebraska.